

## SEQUENCE LISTING

87,1000

<110> Keating, Mark T.  
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 Val Val Arg Leu Trp Ser Ala Gly Cys Arg Ser Lys Tyr Val Gly Leu  
                   20                  25                  30  
 Trp Gly Arg Leu Arg Phe Ala Arg Lys Pro Ile Ser Ile Ile Asp Leu  
                   35                  40                  45  
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                   20                  25                  30  
 Arg Leu Leu Gly Ser Val Val Phe Ile His Arg Gln Glu Leu Ile Thr  
                   35                  40                  45  
 Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val  
           50                  55                  60  
 Tyr Leu Ala Glu Lys Asp Ala Val Asn Glu Ser Gly Arg Val Glu Phe  
           65                  70                  75                  80

123

Gly Ser Tyr Ala Asp Ala Leu Trp Trp Gly Val Val Thr Val Thr Thr  
                                   85                                  90                                  95  
 Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile  
                                   100                                  105                                  110  
 Ala Ser Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala  
                                   115                                  120                                  125  
 Gly Ile Leu Gly Ser Gly Phe Ala Leu  
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 Glu Asp Glu Val Pro Asp Ile Thr Asp Pro Phe Phe Leu Ile Glu Thr  
                                   35                                  40                                  45  
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                                   20                                  25                                  30  
 Glu Asp Thr Leu Asn Leu Pro Lys Ala Pro Val Ser Pro Gln Asp Lys  
                                   35                                  40                                  45  
 Ser Ser Asn Gln Ala Met Ser Leu Ala Ile Leu Arg Val Ile Arg Leu  
                                   50                                  55                                  60  
 Val Arg Val Phe Arg Ile Phe Lys Leu Ser Arg His Ser Lys Gly Leu  
                                   65                                  70                                  75                                  80  
 Gln Ile Leu Gly Arg Thr Leu Lys Ala Ser Met Arg Glu Leu Gly Leu  
                                   85                                  90                                  95  
 Leu Ile Phe Phe Leu Phe Ile Gly Val Val Leu Phe Ser Ser Ala Val  
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124



Tyr Phe Ala Glu Ala Gly Ser Glu Asn Ser Phe  
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 Ser Phe Glu Leu Lys Arg Glu Thr Leu Val Ala Thr Asp Pro Pro Arg  
 35 40 45  
 Pro Thr Ile Asn Leu Asp Pro Arg Val Ser Ile Tyr Ser Gly Arg Arg  
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 Pro Leu Phe Ser Arg Thr Asn Ile Gln Gly Arg Val Tyr Asn Phe Leu  
 65 70 75 80  
 Glu Arg Pro Thr Gly Trp Lys Cys Phe Val Tyr His Phe Thr Val Phe  
 85 90 95  
 Leu Ile Val Leu Ile Cys Leu Ile Phe Ser Val Leu Ser Thr Ile Gln  
 100 105 110  
 Gln Tyr Asn Asn Leu Ala Thr Glu Thr Leu Phe Trp Met Glu Ile Val  
 115 120 125  
 Leu Val Val Phe Phe Gly Ala Glu Tyr Val Val Arg Leu Trp Ser Ala  
 130 135 140  
 Gly Cys Arg Ser Lys Tyr Val Gly Val Trp Gly Arg Leu Arg Phe Ala  
 145 150 155 160  
 Arg Lys Pro Ile Ser Val Ile Asp Leu Ile Val Val Val Ala Ser Val  
 165 170 175

Ile Val Leu Cys Val Gly Ser Asn Gly Gln Val Phe Ala Thr Ser Ala  
180 185 190

Ile Arg Gly Ile Arg Phe Leu Gln Ile Leu Arg Met Leu His Val Asp  
195 200 205

Arg Gln Gly Gly Thr Trp Arg Leu Leu Gly Ser Val Val Phe Ile His  
210 215 220

Arg Gln Glu Leu Ile Thr Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile  
225 230 235 240

Phe Ser Ser Tyr Phe Val Tyr Leu Ala Glu Lys Asp Ala Ile Asp Ser  
245 250 255

Ser Gly Glu Tyr Gln Phe Gly Ser Tyr Ala Asp Ala Leu Trp Trp Gly  
260 265 270

Val Val Thr Val Thr Thr Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr  
275 280 285

Trp Ile Gly Lys Thr Ile Ala Ser Cys Phe Ser Val Phe Ala Ile Ser  
290 295 300

Phe Phe Ala Leu Pro Ala Gly Ile Leu Gly Ser Gly Phe Ala Leu Lys  
305 310 315 320

Val Gln Gln Lys Gln Arg Gln Lys His Phe Asn Arg Gln Ile Pro Ala  
325 330 335

Ala Ala Ser Leu Ile Gln Thr Ala Trp Arg Cys Tyr Ala Ala Glu Asn  
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Phe Ser Val Leu Ser Thr Ile Glu Gln Tyr Ala Ala Leu Ala Thr Gly  
35 40 45

Thr Leu Phe Trp Met Glu Ile Val Leu Val Val Phe Phe Gly Thr Glu  
50 55 60

Tyr Val Val Arg Leu Trp Ser Ala Gly Cys Arg Ser Lys Tyr Val Gly  
65 70 75 80

Leu Trp Gly Arg Leu Arg Phe Ala Arg Lys Pro Ile Ser Ile Ile Asp  
85 90 95

Leu Ile Val Val Val Ala Ser Met Val Val Leu Cys Val Gly Ser Lys  
 100 105 110  
 Gly Gln Val Phe Ala Thr Ser Ala Ile Arg Gly Ile Arg Phe Leu Gln  
 115 120 125  
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 Leu Gly Ser Val Val Phe Ile His Arg Gln Glu Leu Ile Thr Thr Leu  
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 Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val Tyr Leu  
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 Ala Glu Lys Asp Ala Val Asn Glu Ser Gly Arg Val Glu Phe Gly Ser  
 180 185 190  
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 195 200 205  
 Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile Ala Ser  
 210 215 220  
 Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala Gly Ile  
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 275 280 285  
 Tyr Ile Arg Lys Ala Pro Arg Ser His Thr Leu Leu Ser Pro Ser Pro  
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 Lys Pro Lys Lys Ser Val Val Val Lys Lys Lys Lys Phe Lys Leu Asp  
 305 310 315 320  
 Lys Asp Asn Gly Val Thr Pro Gly Glu Lys Met Leu Thr Val Pro His  
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 385 390 395 400  
 Arg Glu His His Arg Ala Thr Ile Lys Val Ile Arg Arg Met Gln Tyr  
 405 410 415  
 Phe Val Ala Lys Lys Lys Phe Gln Gln Ala Arg Lys Pro Tyr Asp Val  
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Arg Asp Val Ile Glu Gln Tyr Ser Gln Gly His Leu Asn Leu Met Arg  
435 440 445

Val Ile Lys Glu Leu Gln Arg Arg Leu Asp Gln Ser Ile Gly Lys Pro  
450 455 460

Ser Leu Phe Ile Ser Val Ser Glu Lys Ser Lys Asp Arg Gly Ser Asn  
465 470 475 480

Thr Ile Gly Ala Arg Leu Asn Arg Val Glu Asp Lys Val Thr Gln Leu  
485 490 495

Asp Gln Arg Leu Ala Leu Ile Thr Asp Met Leu His Gln Leu Leu Ser  
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Leu His Gly Gly Ser Thr Pro Gly Ser Gly Gly Pro Pro Arg Glu Gly  
515 520 525

Gly Ala His Ile Thr Gln Pro Cys Gly Ser Gly Gly Ser Val Asp Pro  
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Met Glu Thr Arg Gly Ser Arg Leu Thr

1

5

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Gly Gly Gln Gly Arg Val Tyr Asn Phe Leu Glu Arg Pro Thr Gly Trp  
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Lys Cys Phe Val Tyr His Phe Ala Val Phe Leu Ile Val Leu Val Cys  
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ctc atc ttc agc gtg ctg tcc acc atc gag cag tat gcc gcc ctg gcc 258  
Leu Ile Phe Ser Val Leu Ser Thr Ile Glu Gln Tyr Ala Ala Leu Ala  
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acg ggg act ctc ttc tgg atg gag atc gtg ctg gtg gtg ttc ttc ggg 306  
Thr Gly Thr Leu Phe Trp Met Glu Ile Val Leu Val Val Phe Phe Gly  
60 65 70

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128

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Ser Lys Gly Gln Val Phe Ala Thr Ser Ala Ile Arg Gly Ile Arg Phe	
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Leu Gln Ile Leu Arg Met Leu His Val Asp Arg Gln Gly Gly Thr Trp	
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Thr Leu Tyr Ile Gly Phe Leu Gly Leu Ile Phe Ser Ser Tyr Phe Val	
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Ile Gly Tyr Gly Asp Lys Val Pro Gln Thr Trp Val Gly Lys Thr Ile	
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gcc tcc tgc ttc tct gtc ttt gcc atc tcc ttc ttt gcg ctc cca gcg	834
Ala Ser Cys Phe Ser Val Phe Ala Ile Ser Phe Phe Ala Leu Pro Ala	
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ggg att ctt ggc tgc ggg ttt gcc ctg aag gtg cag cag aag cag agg	882
Gly Ile Leu Gly Ser Gly Phe Ala Leu Lys Val Gln Gln Lys Gln Arg	
250 255 260 265	
cag aag cac ttc aac cgg cag atc ccg gcg gca gcc tca ctc att cag	930
Gln Lys His Phe Asn Arg Gln Ile Pro Ala Ala Ala Ser Leu Ile Gln	
270 275 280	
acc gca tgg agg tgc tat gct gcc gag aac ccc gac tcc tcc acc tgg	978
Thr Ala Trp Arg Cys Tyr Ala Ala Glu Asn Pro Asp Ser Ser Thr Trp	
285 290 295	
aag atc tac atc cgg aag gcc ccc cgg agc cac act ctg ctg tca ccc	1026
Lys Ile Tyr Ile Arg Lys Ala Pro Arg Ser His Thr Leu Leu Ser Pro	
300 305 310	
agc ccc aaa ccc aag aag tct gtg gtg gta aag aaa aaa aag ttc aag	1074
Ser Pro Lys Pro Lys Lys Ser Val Val Val Lys Lys Lys Lys Phe Lys	
315 320 325	
ctg gac aaa gac aat ggg gtg act cct gga gag aag atg ctc aca gtc	1122
Leu Asp Lys Asp Asn Gly Val Thr Pro Gly Glu Lys Met Leu Thr Val	
330 335 340 345	

ccc cat atc acg tgc gac ccc cca gaa gag cgg cgg ctg gac cac ttc	1170
Pro His Ile Thr Cys Asp Pro Pro Glu Glu Arg Arg Leu Asp His Phe	
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tct gtc gac ggc tat gac agt tct gta agg aag agc cca aca ctg ctg	1218
Ser Val Asp Gly Tyr Asp Ser Ser Val Arg Lys Ser Pro Thr Leu Leu	
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gaa gtg agc atg ccc cat ttc atg aga acc aac agc ttc gcc gag gac	1266
Glu Val Ser Met Pro His Phe Met Arg Thr Asn Ser Phe Ala Glu Asp	
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ctg gac ctg gaa ggg gag act ctg ctg aca ccc atc acc cac atc tca	1314
Leu Asp Leu Glu Gly Glu Thr Leu Leu Thr Pro Ile Thr His Ile Ser	
395 400 405	
cag ctg cgg gaa cac cat cgg gcc acc att aag gtc att cga cgc atg	1362
Gln Leu Arg Glu His His Arg Ala Thr Ile Lys Val Ile Arg Arg Met	
410 415 420 425	
cag tac ttt gtg gcc aag aag aaa ttc cag caa gcg cgg aag cct tac	1410
Gln Tyr Phe Val Ala Lys Lys Lys Phe Gln Gln Ala Arg Lys Pro Tyr	
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gat gtg cgg gac gtc att gag cag tac tcg cag ggc cac ctc aac ctc	1458
Asp Val Arg Asp Val Ile Glu Gln Tyr Ser Gln Gly His Leu Asn Leu	
445 450 455	
atg gtg cgc atc aag gag ctg cag agg agg ctg gac cag tcc att ggg	1506
Met Val Arg Ile Lys Glu Leu Gln Arg Arg Leu Asp Gln Ser Ile Gly	
460 465 470	
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Lys Pro Ser Leu Phe Ile Ser Val Ser Glu Lys Ser Lys Asp Arg Gly	
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Ser Asn Thr Ile Gly Ala Arg Leu Asn Arg Val Glu Asp Lys Val Thr	
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Gln Leu Asp Gln Arg Leu Ala Leu Ile Thr Asp Met Leu His Gln Leu	
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ctc tcc ttg cac ggt ggc agc acc ccc ggc agc ggc ggc ccc ccc aga	1698
Leu Ser Leu His Gly Gly Ser Thr Pro Gly Ser Gly Gly Pro Pro Arg	
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Glu Gly Gly Ala His Ile Thr Gln Pro Cys Gly Ser Gly Gly Ser Val	
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Asp Pro Glu Leu Phe Leu Pro Ser Asn Thr Leu Pro Thr Tyr Glu Gln	
555 560 565	
ctg acc gtg ccc agg agg ggc ccc gat gag ggg tcc tgaggagggg	1840
Leu Thr Val Pro Arg Arg Gly Pro Asp Glu Gly Ser	
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ctctgaagga ggccacctcc taaaaggccc agagagaaga gcccactct cagaggcccc	1960

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Thr Ile Glu Gln Tyr Ala Ala Leu Ala Thr Gly Thr Leu Phe Trp Met  
50 55 60  
Glu Ile Val Leu Val Val Phe Phe Gly Thr Glu Tyr Val Val Arg Leu  
65 70 75 80  
Trp Ser Ala Gly Cys Arg Ser Lys Tyr Val Gly Leu Trp Gly Arg Leu  
85 90 95  
Arg Phe Ala Arg Lys Pro Ile Ser Ile Ile Asp Leu Ile Val Val Val  
100 105 110  
Ala Ser Met Val Val Leu Cys Val Gly Ser Lys Gly Gln Val Phe Ala  
115 120 125  
Thr Ser Ala Ile Arg Gly Ile Arg Phe Leu Gln Ile Leu Arg Met Leu  
130 135 140

His Val Asp Arg Gln Gly Gly Thr Trp Arg Leu Leu Gly Ser Val Val  
 145 150 155 160  
 Phe Ile His Arg Gln Glu Leu Ile Thr Thr Leu Tyr Ile Gly Phe Leu  
 165 170 175  
 Gly Leu Ile Phe Ser Ser Tyr Phe Val Tyr Leu Ala Glu Lys Asp Ala  
 180 185 190  
 Val Asn Glu Ser Gly Arg Val Glu Phe Gly Ser Tyr Ala Asp Ala Leu  
 195 200 205  
 Trp Trp Gly Val Val Thr Val Thr Thr Ile Gly Tyr Gly Asp Lys Val  
 210 215 220  
 Pro Gln Thr Trp Val Gly Lys Thr Ile Ala Ser Cys Phe Ser Val Phe  
 225 230 235 240  
 Ala Ile Ser Phe Phe Ala Leu Pro Ala Gly Ile Leu Gly Ser Gly Phe  
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 Ala Leu Lys Val Gln Gln Lys Gln Arg Gln Lys His Phe Asn Arg Gln  
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 Ile Pro Ala Ala Ala Ser Leu Ile Gln Thr Ala Trp Arg Cys Tyr Ala  
 275 280 285  
 Ala Glu Asn Pro Asp Ser Ser Thr Trp Lys Ile Tyr Ile Arg Lys Ala  
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 Pro Arg Ser His Thr Leu Leu Ser Pro Ser Pro Lys Pro Lys Lys Ser  
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 Pro Glu Glu Arg Arg Leu Asp His Phe Ser Val Asp Gly Tyr Asp Ser  
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 Ser Val Arg Lys Ser Pro Thr Leu Leu Glu Val Ser Met Pro His Phe  
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 385 390 395 400  
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 420 425 430  
 Lys Phe Gln Gln Ala Arg Lys Pro Tyr Asp Val Arg Asp Val Ile Glu  
 435 440 445  
 Gln Tyr Ser Gln Gly His Leu Asn Leu Met Val Arg Ile Lys Glu Leu  
 450 455 460  
 Gln Arg Arg Leu Asp Gln Ser Ile Gly Lys Pro Ser Leu Phe Ile Ser  
 465 470 475 480

132



Val Ser Glu Lys Ser Lys Asp Arg Gly Ser Asn Thr Ile Gly Ala Arg  
485 490 495

Leu Asn Arg Val Glu Asp Lys Val Thr Gln Leu Asp Gln Arg Leu Ala  
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Leu Ile Thr Asp Met Leu His Gln Leu Leu Ser Leu His Gly Gly Ser  
515 520 525

Thr Pro Gly Ser Gly Gly Pro Pro Arg Glu Gly Gly Ala His Ile Thr  
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Gln Pro Cys Gly Ser Gly Gly Ser Val Asp Pro Glu Leu Phe Leu Pro  
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133

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